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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/884,670	06/19/2001	Stephen R. Fox	YOR920010104(14270)	4482

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EXAMINER	
POMPEY, RON EVERETT	
ART UNIT	**PAPER NUMBER**
2812	

DATE MAILED: 11/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/884,670	FOX ET AL.	
	Examiner	Art Unit	
	Ron E Pompey	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 August 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-22,25-36,40,48,49,51 and 52* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3-22, 25-36, 40 and 48, 49 and 51-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3-22, 25-36, 40 and 48, 49 and 51-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sadana et al. (US 6,090,689) in further view of Tachimori et al. (US 5,534,446), Sadana et al. (US 5,930,643) and admitted prior art.

Sadana ('689) discloses the steps of:

For claims 1-22 and 25-29:

implanting oxygen ions (14, 18, fig. 2) into a surface of a Si-containing substrate, said implanted oxygen ions having a concentration sufficient to form a buried oxide region during a subsequent annealing step; and

annealing said substrate wherein, said implanted oxygen ions form said buried oxide region (22, fig. 3) (col. 3, lns. 6-12 and col. 4, ln. 8 – col. 5, ln. 34).

Sadana ('689) discloses the claimed invention except for:

wherein the annealing step is carried out in an ambient gas comprising at least one high-surface mobility gas that hinders oxide growth;

wherein the annealing step comprises the steps of: partially annealing the substrate so as to form a surface layer of oxygen on the substrate; stripping the surface

layer of oxygen; and continuing the annealing to complete the formation of said BOX region; and

optically detecting said other defects.

However, Tachimori teaches an annealing step is carried out in an ambient gas comprising at least one high-surface mobility gas that hinders oxide growth (col. 7, ln. 55 – col.8, ln.5) and Sadana('643) teaches partially annealing the substrate so as to form a surface layer of oxygen on the substrate; stripping the surface layer of oxygen; and continuing the annealing to complete the formation of said BOX region (col. 5, lns. 22-43).

Therefore it would have been obvious to those of ordinary skill in the art to combine Tachimori and Sadana ('643) because, the high-surface mobility gas will prevent the semiconductor surface from roughening and that the oxide is of poor quality and needs to be removed before forming a device on the SOI substrate.

Also the admitted prior art (see page 3, lines 1-4) disclose is it well known in the art to use an optical inspection tool to inspect process induced features or defects.

Response to Arguments

3. Applicant's arguments filed 8-23-04, pertaining to claims 1, 3-22, 25-36, 40 and 48, 49 and 51-52, have been fully considered but they are not persuasive. The applicant argues that "...none of the prior art methods teach or suggest a method in which annealing is carried out until tile or divot defects present at a top surface of said superficial Si-containing layer are reduced so as to allow optical detection of any other

defect that has a lower density than the tile or divot defect, and then optically detecting said other defects."

However, since the prior art reads on the **claimed** parameters used to anneal an oxygen-implanted substrate the same results will be achieved as applicants **claimed** invention.

The applicant argues that Sadana '689 first annealing step is performed at lower temperatures than presently claimed. This statement is correct. However, applicant fails to acknowledge an anneal, subsequent to the first anneal, that is performed "...above 1100^{O}C and below melting (1420 ^{O}C or Si)", see Sadana '689 column 5, lines 18-19. Therefore this subsequent anneal does read on the claimed high temperature (of about 1250^{O}C or greater) anneal.

The Tachimori reference, according to the applicant uses a single implant and a normal O_2 pressure anneal which does not help the deficiencies of Sadana '689. The examiner would like to point out that the Tachimori reference was used to disclose annealing step, after oxygen implantation, in an ambient gas comprising an inert carrier. The applicant presents no arguments pertaining to why the Tachimori reference does not disclose these limitations; therefore the examiner will take this as an affirmation that the Tachimori reference reads on those limitations.

The Sadana '643 reference, according to the applicant does not teach or suggest which ambient can be used to reduce tile or divot defects in the SOI layer. First, the examiner would like to point out that the Sadana '643 reference was used to teach partially annealing the substrate so as to form a surface layer of oxygen on the

substrate; stripping the surface layer of oxygen; and continuing the annealing to complete the formation of said BOX region (col. 5, lns. 22-43). Since the applicant presents no arguments pertaining to why the Sadana '643 reference does not disclose these limitations, therefore the examiner will take this as an affirmation that the Tachimori reference reads on those limitations. Secondly, the Sadana '643 reference does disclose ambients that are enclosed within the range as claimed by applicant therefore will have the same result as the claimed invention, reduced tile or divot defects. From the examiner's standpoint a range of values means that using any value within that range will give you the desired result.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ron E Pompey whose telephone number is (571) 272-1680.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (571) 272-1679.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ron Pompey
AU:2812
November 27, 2004

John F. Niebling
Supervisory Patent Examiner
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